

centages of parasitism ranging from twenty-five to thirty per cent, indicating that the parasite may prove of great importance in the natural control of the apple maggot.

REFERENCE.

1912. QUAINANCE and JENNE.—Bur. Ent. Bull. 103, pp. 140-142.
 1918. BROOKS, F. E.—Bur. Ent. Bull. 730, p. 14.

REVISION OF THE GENUS *LYGAEUS* FAB. (HEMIPTERA-HETEROPTERA).

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Characters of the genus.—Pronotum either without a median longitudinal keel or with a keel not reaching anterior margin; posterior margin straight before scutellum. Scutellum depressed, with a longitudinal median keel commonly joined to a median or premedian transverse ridge. Metapleura with posterior margin straightly or somewhat roundly truncate not oblique, the anterior and posterior margins of this nearly parallel.

Corium almost or quite impunctate; its posterior margin straight. Membrane not at all or usually narrowly but never with the apex more widely white margined; rarely entirely or for the most part clear of whitish. Head (except in *Melanocoryphus* Stål) with a red or pale spot or longitudinal fascia near base; eyes in contact with the anterior margin of pronotum. Species mostly black marked with red or sometimes with the latter color predominating.

Key to Subgenera and Species.

1. Pronotum black provided with a postmedian transverse red band or three red spots, remote from posterior margin. Venter most commonly red with fascia at anterior angles of segments 2-5 and all of sixth and genital segments black or most rarely (*formosus*) venter entirely black. Odoriferous orifices black. Head with red fascia at least at base. Larger species, 10-12 mm.
 Subgenus (*Graptolomus* Stål) *Lygaeus* Fab., Van Duz..... 2.
- Pronotum unprovided with a transverse postmedian red fascia, remote from posterior margin. Species smaller 6.
2. Clavus pale margined within, never furnished with a subapical black spot. Venter of abdomen entirely black. *formosus* Blanch.
- Clavus never pale margined, either entirely black or anteriorly red; opposite apex of scutellum furnished with an opaque black spot. Venter red marked with black 3.
3. Membrane in great part pale with fuscous veins. Broad margins of all pleurae posteriorly, propleurae anteriorly, bucculae and acetabulae pale fusco-reddish *truculentus* Stål.
- Membrane either entirely black or most commonly pale margined with concolorous veins, with or without white discal spots. Bucculae, acetabulae and margins of pleurae not pale 4.

4. Membrane entirely black without pale margins or white discoidal or basal spots. Clavus anteriorly red. Head with a Y-shaped red fascia, the anterior arms of which are extended beneath the antenniferous tubercles (= *trimaculatus* Dall.) *turcicus* Fab.
 — Membrane pale margined, with or without white discoidal spots. Clavus either entirely black or anteriorly red. Red fascia at base of head most commonly reduced in size 5.
5. Clavus entirely black. Membrane variable, either only narrowly margined with white and occasionally furnished with less conspicuous white discal spots (Eastern forms) or broadly margined and furnished with conspicuous white discal spots (Western forms)..... *kalmii* Stål.
 — Clavus anteriorly red. Membrane narrowly margined and most commonly furnished with white discal spots which are often reduced and sometimes wanting *reclivatus* Say.
6. Pronotum entirely black or sometimes only humeral angles red. Odoriferous orifices black. Head with red basal spot (sometimes obscured in *bistriangularis*). Corium and clavus bright red. Membrane very narrowly and evenly white margined. Sixth and genital ventral segments black Subgenus *Melanopleurus* Stål 7.
 — Pronotum rarely entirely black (*pyrrhopterus*), if so then as in the other members of the subgenus *Ochrostomus* the odoriferous orifices are pale. Commonly the anterior, lateral at least in part and most frequently the posterior margin of the pronotum red or pale or the latter trimaculate with red 8.
7. Size larger, 8-9 mm. long. Bucculae variable but commonly higher and more semicircularly elevated. Bucculae, acetabulae, anterior margin of propleurae and posterior margins of pro- and mesopleurae rather broadly and conspicuously pale *belfragei* Stål.
 — Size smaller, 5-6 mm. long. Bucculae lower, less semicircularly elevated. Bucculae, acetabulae, margins of pleurae, inconspicuously, narrowly pale bordered *bistriangularis* Say.
8. All margins of pronotum and hemielytra conspicuously bordered with red or yellow. Orifices black. Base of head with red spot. Bucculae, acetabulae, anterior margin of propleura and posterior margins of all pleurae broadly pale or yellow. Venter red with sixth and genital segments black. (*L. uhleri* Stål.) Subgenus *Craspeduchus* Stål.
 — Rarely with entire margins of pronotum and hemielytra bordered with red or pale, if so then is the venter entirely black or margined with red or the head is without a red spot at base 9.
9. Head with a red or pale spot at base. Orifices pale. Coloration of venter variable, entirely black or margined with red or pale or only the sixth and genital segments black Subgenus *Ochrostomus* Stål. 10.
 — Head entirely black. Orifices black, rarely pale (*mimulus*) in which case base of legs and apices of femora pale. Coloration of venter variable, most frequently entirely black or narrowly red margined, rarely for the most part red (*bicrucis*). Membrane with or without median white discoidal spot 14.
10. Venter red, sometimes more or less infuscated, sixth and genital segments

- black. Pronotum black. Hemielytra red, more or less infuscated, apical margin pale. Membrane more broadly bordered with white along outer lateral margin. (= var. *melanopleurus* Uhl.) *pyrrhopterus* Stål.
- Venter either entirely black or fuscous or sometimes pale or red margined. Pronotum either with posterior margin trimaculate with red or entire pronotum reddish 11.
11. Venter entirely fuscous. Corium fuscous with apical angles only red. Membrane embrowned not margined with white *tripligatus* Barb.
- Venter black or fuscous, disk sometimes and margins pale or red. Corium either fuscous, margined with red or for the most part reddish. Membrane margined with white 12.
12. Pronotum ochraceous-red, provided with four short, premedian impressions. Corium ochraceous-red more or less infuscated, apical margin yellow. Membrane more narrowly pale margined in brachypterous forms. Pale spot at base of head often obscure *rubricatus* n. sp.
- Pronotum posteriorly trimaculate with red. Corium fuscous, costal. Commissural and apical margins and apical carina of scutellum red or pale. Membrane margined with white 13.
13. Pronotum with anterior margin red, fuscous markings form a T shaped fascia on each side of median line. Membrane rather narrowly and evenly bordered with white. Bucculae, acetabulae, anterior and lateral margins and posterior angles of prosternum broadly ochraceous-red. *lineola* Dall.
- Anterior margin of pronotum not bordered with red. Apical margin of corium and membrane except at apex rather broadly bordered with white. Bucculae, acetabulae, anterior margin of prosternum broadly and posterior margins of all pleurae narrowly white. (= *associus* Uhler ms.) *carnosulus* Van D.
14. Membrane with a median white discoidal spot or variegated with white. Species pilose, small *Lygaeospilus* new subgenus. 15.
- Membrane without median white discoidal spot, entirely fuscous or pale margined or rarely lacteus with fuscous veins (*nigrinervis*). Entirely nude or only slightly pilose. Larger species, over 5 mm. Subgenus *Melanocoryphus* Stål. 16.
15. Membrane fuscous, pale margined and provided with a rather clean cut transverse median white spot, often prolonged and continuous to middle base of membrane. Hemielytra red often more or less infuscated. Venter entirely fuscous or sometimes margined with red. (= *Lygaeus albulus* Dist. and *Lygaeosoma solida* Uhl.) *pusio* Stål.
- Membrane fuscous, variegated with white, discoidal spot more or less confused with pale variegations of surface; not pale margined, provided with triangular white fascia at outer basal angles. Hemielytra generally entirely fuscous or fusco-rufescent, rarely pale margined. Lateral margins of venter sometimes red or pale. (= *albulus* of various authors nec Distant and *obsuripennis* Stål.) *tripunctatus* Dall.
16. Posterior lobe of pronotum, corium, venter except genital segments and small vittae, red. Anterior margin of pronotum, clavus, posterior margins of corium, bucculae, acetabulae, anterior margin of prosternum

- um and posterior margins of all pleurae conspicuously white or pale yellow.....*bicrucis* Say.
- Posterior lobe of pronotum, corium, clavus and venter entirely or for the most part fuscous.....17.
17. Anterior lobe of pronotum and head between eyes and tylus ochraceous-red; posterior lobe bivittate with fuscous. Costal, apical, commissural margins of hemielytra, apical carina of scutellum, lateral margins and central disk of venter, pale yellow. Bucculae, antenniferous tubercles beneath, acetabulae, prosternum for most part and posterior margins of pleurae, pale yellow. Orifices, bases of legs and apices of femora pale. Membrane scarcely pale marginal.....*mimulus* Stål.
- Anterior and posterior lobe of pronotum concolorous fuscous; sometimes the anterior or the posterior margin red or the latter trimaculate with red; sometimes the lateral margins bordered with red. Orifices, legs and venter black, the latter sometimes red or pale margined.....18.
18. Membrane lacteous with prominent fuscous veins and spot near outer basal angle.....*nigrinervis* Stål.
- Membrane entirely fuscous or most frequently margined with white, sometimes in *lateralis* provided with a sub-basal white spot.....19.
19. Corium entirely fuscous, never margined with red or yellow. Membrane scarcely pale margined. Anterior and humeral margins and sometimes posterior median fascia, red. Venter not red margined.....*rubicollis* Uhl.
- Corium with at least costal margins bordered with red or yellow. Pronotum with anterior, humeral or entire lateral margins and median posterior fascia red or yellow.....20.
20. Humeral red fascia not extended anteriorly beyond middle of pronotum. Anterior margin of prosternum, bucculae, and acetabulae very obscurely pale. Apical carina of scutellum not red. Membrane margined with white. Venter entirely fuscous or rarely margined with red.....21.
- Humeral red fascia extended beyond middle or entire edge of pronotum reddish. Anterior margin of prosternum, bucculae and acetabulae prominently and more broadly pale or yellow. Apical carina of scutellum red. Membrane with or without white margin. Margin of venter red.....22.
21. Margins of venter rarely red. Costal margin only of hemielytra red. Sunken disk of pronotum on either side of post median ridge closely and coarsely punctate. Larger species, about 8mm. Membrane sometimes with a lunate white spot near base.....*lateralis* Dall.
- Margins of venter red. Costal, apical, commissural and inner claval margins of hemielytra red, sometimes entire apical angle of corium red. Disk of pronotum on either side of post median ridge finely or obscurely punctate. Smaller species, 5 mm. *admirabilis* Uhl.
22. Membrane very obscurely, narrowly white margined. Costal margins of hemielytra prominently and sometimes commissural and inner claval margins very narrowly red or yellow. (= ? *rubniger* Stål.)
facetus Say.

- Membrane plainly white margined. Costal, apical, commissural and inner claval margins of hemielytra plainly red *circumlitus* Stål.

***Lygaeus rubricatus*, n. sp.**

Coloration.—Ochraceous-red, with antennae, head and sometimes more or less of the hemielytra infuscated; narrow apical margin of corium and frequently apical carina of scutellum pale yellow. Membrane fuscous, narrowly pale margined in brachypterous forms, more broadly pale in macropterous forms. Obscure pale spot at base of head. Beneath, head, rostrum, meso- and metasternum, venter and legs for the most part brownish. Prosternum reddish-ochraceous. Bucculae, acetabulae, sometimes the posterior margins of meso- and metapleura, disk and lateral margins of venter and frequently base of legs, pale ochraceous. Odoriferous orifices pale.

Head, lateral margins of pronotum and surface of hemielytra sparsely short pilose. Bucculae rather low, not extended much beyond middle of head. Tip of rostrum reaching between posterior coxae. Reddish-ochraceous pronotum impunctate, with anterior margin rather strongly concave, submargin impressed on either side; provided just before middle with four short pronounced transverse impressions, the two inner ones more narrowly separated; median longitudinal carina faintly indicated; disc on either side scarcely depressed. Hemielytra fusco-reddish with lightly elevated veins sometimes paler. Membrane frequently abbreviated, then scarcely reaching beyond apex of 5th abdominal segment and more narrowly margined with white.

Length, 5–6 mm.

Type.—♂ Tucson, Ariz., Apr. 21, Coll. by H. G. Hubbard (Type No. 24116 U. S. N. M.).

Paratypes.—♂ Tucson, Ariz., Apr. 29, 2 ♀'s Tucson, Ariz., 1 ♀ Ft. Yuma, Ariz., Jan. 28, 4 ♀'s "Ariz" (U. S. N. M.); 3 ♀'s Scottsdale, Ariz. (my Coll.).

This species belongs in the subgenus *Ochrostomus*, being most closely related to *L. carnosulus* Van D. from which it can easily be separated by color differences as given in the preceding Key. Eight of the twelve specimens mentioned above are brachypterous.

SYNONYMY AND DISTRIBUTION.

Subgenus *Lygaeus* (Fab) Van Duzee.

formosus Blanchard—Fla., Neotropical.

truculentus Stål—Calif., Neotropical.

turcicus Fab (= *trimaculatus* Dallas). U. S. as far west as the Rocky Mts.

kalmii Stål.—U. S., Mexico.

subspecies *kalmii* (Stål) Parshley—Western U. S.

“ *angustomarginatus* Parshley—Eastern U. S.

recliratus Say—West and Southwest U. S., Neotropical.

var. *enotus* Say (= *costalis* H. S.)—Mexico.